OBSERVATIONS AT A CAROLINA WREN NEST FROM WHICH BROWN-HEADED COWBIRDS FLEDGED

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Records of Carolina Wrens (*Thryothorus ludovicianus*) fledging Brown-headed Cowbirds (*Molothrus ater*) are rare, with only one instance reported among a dozen or so known parasitized nests (Friedmann, 1963:39). Most of the evidence that this species successfully hosts cowbirds is circumstantial and includes infrequent reports of fledgling cowbirds being fed by wrens. In view of this lack of data, I present my detailed observations of a banded pair of these wrens, which successfully fledged three cowbirds. The observations were made at our 12-acre bird sanctuary near the Pine Hills Nature Preserve, Shades State Park, in Montgomery County, Indiana. I spent about 35 hours at the task, observing without a blind 18 feet from the nest.

The wrens' nest was in a shallow, cardboard fruit basket (12 × 8 × 4 inches), suspended six feet above ground beneath the broad eaves of a flat-roofed building. The previous year I banded the wrens as young of the year, the female on 22 May, the male on 9 September. In 1972 I retrapped them and added color bands, later sexing them by their behavior. On 7 June these inexperienced wrens completed their nest, leaving an unusually large opening above the rim of the basket, which faced outward in full view, a boon to the cowbirds and to me as well.

Between 7 and 17 June four Carolina Wren eggs and three Brown-headed Cowbird eggs were laid in the nest, but a wren egg was probably removed by a cowbird. Two cowbirds evidently deposited the eggs because two eggs of this species were laid in the nest on the same morning. On 18 June and again on 21 June, single wren eggs vanished, leaving three cowbird eggs and only two wren eggs.

The cowbird eggs hatched on 22 and 23 June, while those of the wrens did not hatch until 26 and 27 June. The last-hatched wren died soon after hatching, apparently crushed by the weight of the three much larger cowbirds. On the next day the other wren was gone, presumably having died and been removed by its parent.

FEEDING OF YOUNG

During 29 hours of observation, I obtained data on the hourly rate the pair of Carolina Wrens fed the three cowbirds. Unfortunately, I could not be at the nest, except for brief periods, until the cowbirds were four and five days old. Therefore, the following data are based on observations made

TABLE 1

NUMBER AND RATE OF FEEDINGS OF NESTLING COWBIRDS BY WRENS

Date 1972	Hours watched	Feedings: Total per day by ♂	by ♀	by ♂ and ♀	Average per hour[1] by ♂	by ♀	by ♂ and ♀	Remarks
27 June	9	37	29	66	4.1	3.2	7.3	3 cowbirds (ages 4 and 5 days), 2 wrens (ages 0 and 1 days); 1 wren dead by 16:15.
28 June	1	11	3	14	11.0	3.0	14.0	3 cowbirds, last young wren gone by early morning.
1 July	3	29	26	55	9.7	8.6	18.3	3 cowbirds.
2 July	5	63	39	102	12.6	7.8	20.4	3 cowbirds.
3 July	11	115	129	244	10.5	11.7	22.2	Cowbirds (ages 10 and 11 days) fledged at 07:04, 19:46, and 19:53.
Totals	29	255	226	481	x̄ 8.8	x̄ 7.8	x̄ 16.6	

[1] Determined by dividing total feedings by number of hours watched.

on five of the last seven days the cowbirds were in the nest (which included the single day the two wren nestlings were present).

The wrens brought 481 meals during this period, the female carrying 226 of these and the male 255. The average number of feedings per hour was 16.6, 7.8 by the female and 8.8 by the male. Food appeared to be largely composed of spiders of various sizes, including harvestmen or "daddy long-legs," and occasional caterpillars and moths. Only one young was fed per trip. A summary of the number and rate of feedings is given in Table 1.

On 27 June I observed the nest for a nine-hour period and found the feeding rate to be only 7.3 times per hour. This low rate apparently was the result of the very large size of insects consistently brought to the young, insects too large even for the cowbirds to swallow easily. In one instance the male made nine attempts before successfully feeding a large spider to a cowbird. This was the one day on which the complete brood of three cowbirds (four and five days old) and two wrens (one a day old and one hatched that morning) was present. On the following day, after the two young wrens had died, the parents consistently brought small insects, and the feeding rate doubled.

Apparently the parents treated the mixed brood of five as a normal one in which there were weaklings: in this case the weaklings were their own nestlings. Neither parent fed the young wrens while I watched during the nine hours on 27 June. The older young was too weak to compete for food, whereas the wren hatched that morning was never able to get out from under the much larger cowbirds, which completely covered and trampled it.

On 3 July, fledging day, the foster parents brought 244 meals during my 11 hours of observations, the female carrying 129 of these and the male parent 115. In the first hour, the wren pair fed the three young cowbirds 28 meals at the average rate of 9.3 per nestling. The female fed 15 meals and the male 13. At the end of that hour, the first cowbird fledged. With two cowbirds remaining in the nest, the rate peaked in the following hour at an all-time high of 39 meals (20 of these were brought by the female and 19 by the male), with the rate of 19.5 meals per nestling per hour. By comparison, the average hourly rate of feeding on that day was 22.2. Since the fledged cowbird was not visible to me, I could not see how frequently it was fed.

Nice and Thomas (1948:157), observing at an unparasitized Carolina Wren nest, found the rate of feeding during the hour immediately prior to the fledging of a brood of five was 18 meals per hour (7 by the male and 11 by the female). Had the wrens fed equally, each would have received 3.6 meals. During that hour on fledging day in my study, the foster parents fed a total of 10 more meals per hour to three cowbirds than the wren parents fed to Nice' and Thomas's five wren nestlings. These figures indicate that if the individuals were fed equally within each nest, each cowbird would have received 5.7 more meals during that hour than did each wren. The parasites were age 10 and 11 days, the wrens 13 and 14.

When the young in each nest were five and six, eight and nine, and nine and ten days old, respectively, I found that "my" wrens averaged 17.6 feedings per hour per day, while those studied by Nice and Thomas averaged 11.2. Thus, the cowbirds received an average of 6.4 more meals per hour daily than did the wrens. Individual cowbirds, therefore, were fed at the rate of 5.9 meals per hour per day, the wrens 2.2 during these three days.

Laskey (1948:109) found that when two Carolina Wren nestlings were 10 days old, the average number of meals brought per hour was 6.1, compared to 21.6 the two remaining cowbirds of my study received at the same age. Therefore, the cowbirds were fed 15.5 more times per hour than were the wrens. This was at the hourly rate of 10.8 meals per cowbird, versus 3.0 meals per wren. Thus the cowbirds were fed over three times as frequently as were the wrens. Laskey observed for 7.4 hours and I observed for 10

during this period of comparison. (Her overall study is based on 81.1 hours of observation.)

The above comparisons suggest an increase in the feeding rate by Carolina Wrens when they are parasitized. The greatest degree of difference, 15.5 more meals per hour for the cowbirds, occurred in comparing the feeding rate when only two 10-day old young were in each nest. This was on fledging day for the cowbirds and three days short of that day for Laskey's wrens. Comparison with Nice and Thomas indicates that "my" wrens made from six to ten more trips per hour per day to feed three cowbirds than they would have with a normal brood of five wrens. However, the wren nestlings fledged at 13 and 14 days, while the cowbirds of this study departed at 10 and 11 days.

DISPOSAL OF FECES

During my observation, fecal matter was carried from the nest 35 times by the male wren and 13 times by the female; it was swallowed on 12 occasions by the male and on 3 by the female. After the cowbirds were eight and nine days old, removal of excreta, no longer encased in mucal sacs, appeared to be difficult when the long stringy mass frequently broke. On the last day in the nest, the young occasionally backed to the rim to defecate. Laskey (op. cit.) reported some fecal sacs were swallowed by the parents in the early days of nest life, but Nice and Thomas (op. cit.) apparently did not observe this behavior.

DEFENSE OF THE NEST

The female wren appeared to take no part in defending the nest; her mate did little more than *chirr* at possible predators, except chipmunks (*Tamias striatus*). When a chipmunk peered into the nest, the male wren flew at the rodent, pecked it, and chased it away. A House Wren (*Troglodytes aedon*), nesting nearby, pursued a chipmunk until it ran through a length of pipe to escape, but as the animal scurried out a few seconds later, the male Carolina Wren immediately took over the pursuit. Fox squirrels (*Sciurus niger*) were completely ignored, but the male wren *chirred* at a cottontail rabbit (*Sylvilagus floridanus*) that was sitting on the roof placidly eating leaves of an overhanging limb. (The building against which the nest basket was suspended abuts against a hill.) The Carolina Wrens were not present when a two-foot-long milk snake (*Lampropeltis doliata*) on the roof dangled its head to within a foot and a half of the nest. The serpent probably was not very hungry; judging from the lumps in its body, I suspected the snake had been feeding on frogs that frequent the roof. Six hours later when the same snake attempted to attain the nest from the ground, the male wren sang loudly.

LEAVING THE NEST

On 3 July I watched the wrens' nest almost continuously from 06:00 until the three cowbirds, now banded, had departed. At 07:04 the female wren flew from the nest after feeding the oldest nestling, bird 1. Apparently triggered by her flight, the cowbird, age 11 days, left the nest, landing in vegetation about five feet away. There it remained for almost an hour. At the end of the second hour, it had progressed about 10 feet by fluttering on or near the ground.

Bird 2, age 10 days, departed at 19:46, after having been fed at 19:00 by the male wren which sang loudly from the roof as if encouraging the young to leave. Bird 2 flew from the rim of the basket to a sapling about five feet away, then fluttered to a lower limb.

The remaining cowbird, bird 3, age 10 days, left the nest at 19:53, almost 13 hours after bird 1 had flown. The female wren was also in the bottom of the basket when this cowbird suddenly flew up toward the roof overhang, then fell to the ground with a slight thud, landing directly under the nest.

On the following morning I found bird 2 still in the sapling, while bird 3 had moved from the ground to a limb about two feet up and five feet from where it had fallen. I failed to find bird 1: I suspect raccoons (*Procyon lotor*) captured it.

By 10:00 bird 3 had moved up the hill about 10 feet from the nest and to within 10 feet of bird 2 now in a small tree. Their flight ability still poorly developed, the young remained in the same area all morning. These young frequently gave a location call, *seeee-eee*. The male wren sang and *chirred*; his mate occasionally uttered a tinkling call. Thus the individuals kept in touch with each other and the fledglings were frequently fed. By evening the young, encouraged by the foster parents, had moved perhaps 20 feet across the hillside toward a brook in a secluded area. I did not see the cowbirds again but the wren pair returned to the nest area eight days later.

DISCUSSION

Two notable departures from normal Carolina Wren behavior were observed. At this parasitized nest the female ceased to incubate at least 24 hours before her own last egg hatched. Apparently, the warmth from the cowbird nestlings was sufficient to hatch the remaining wren egg. Also, the female did not brood the cowbirds after the two younger ones were two days old and did not brood her last hatched wren at all. In my experience, and that of others, the female Carolina Wren typically broods her young for at least four days. The above variations were apparently aggravated by the four- and five-day headstarts of the large cowbird nestlings over the small wrens.

Why was this pair of wrens heavily victimized when Carolina Wrens are apparently rare hosts to cowbirds? A combination of factors may have been involved:

Size of cowbird population.—The cowbird population at our sanctuary has been consistently fairly large. The previous year I color-banded 24 new individuals and had 13 returns from other years, a total of 37 individual cowbirds. In the spring and summer of 1972, I made no attempt to band birds, but I did, more or less, record the color-banded returns. Eleven color-banded cowbirds were frequently observed at the feeders: five females and six males, along with a number of unbanded individuals.

Lack of nests of normal hosts.—In past years cowbirds have deposited eggs in a number of nests in our yard there, parasitizing the Red-eyed Vireo (*Vireo olivaceus*), White-eyed Vireo (*Vireo griseus*), Acadian Flycatcher (*Empidonax virescens*), Yellow Warbler (*Dendroica aestiva*), Indigo Bunting (*Passerina cyanea*), Cardinal (*Cardinalis cardinalis*) and the Song Sparrow (*Melospiza melodia*). (One day I even saw a female cowbird looking into a hummingbirds' nest there!) However, in 1972, nests were extremely scarce in our yard, the lowest record in 20 years. I have no doubt that this paucity was the result of the havoc being wrought on the natural environment by the chain saw, bulldozer, back hoe and other activities relating to the removal of our old cabin and the erecting of our new part-time home on the site. This activity began in early spring and continued until fall. Nests in our yard that season were limited to those of the Carolina and House Wrens, the latter nesting in a wren box. This left only the Carolina Wren nest available for parasitizing. The fact that *two* cowbirds laid eggs in this nest appears to emphasize a scarcity of nests in the area.

Nest and opening too conspicuous.—Carolina Wren nests there have been, more often than not, inaccessible to cowbirds. On the contrary, the parasitized nest described here was not only conspicuously located, but also had an unusually large opening facing outward and *above* the basket rim. A bird house this species had used in past years was only six feet away but was not used. (This pair of wrens built a second nest late in the same season, after all cowbirds had left. This nest, 17 feet from the first nest and over a door of the same buliding, was equally conspicuously located, though the opening was smaller. Although 5 eggs were laid, only two wrens fledged on the late date of 3 September.)

Inexperience of parents.—Did inexperience of the wrens play a part in number 3 (above)? I have found nothing in the literature available to me to support a positive answer, but Pettingill (1969:343) suggests that nest-building abilities of young birds need investigation. Perhaps the following excellent nesting record was merely a matter of chance: at any rate, the

color-banded male started building a nest on the early date of 19 February 1973, this time in a secluded interior of a building. A clutch of six eggs hatched before the start of the cowbird laying season and six wrens fledged. Then a clutch of five eggs was laid in a second well-constructed nest, 15 feet from the first one and in the same building. Five wrens fledged. However, for this nest he had a new mate, his first one having disappeared. From his third nest that season, sometime between 8 and 11 September, the male and his second mate successfully fledged four young from a nest perhaps 40 feet from the first two nests of the season. I was totally unaware of this nesting until I discovered the male carrying an insect in his beak. At that time of year, tall vegetation concealed the location. This well-constructed nest is of special significance to this paper because it was located in the same basket from which the three cowbirds fledged the previous year! I assume that the old nest had been remodeled; however, the much smaller opening could not be seen above the rim of the basket and the top of the nest was barely visible. The only way I could see in *this* nest in the basket was to stand on a ladder. In his second nesting year, the male of this paper successfully raised 15 wrens as opposed to three Brown-headed Cowbirds and two Carolina Wrens his first year.

SUMMARY

A pair of first-year Carolina Wrens successfully fledged three Brown-headed Cowbirds in Montgomery County, Indiana; their own two hatchlings died within a day or two. The feeding rates in this pair of wrens was higher than those reported for non-parasitized nesting wrens—probably as a response to the demands of the cowbirds. Factors leading to this case of parasitism, which is rarely recorded in Carolina Wrens, may be related to the high local density of cowbirds, the scarcity in 1972 of normal nest-hosts, the vulnerability of the nest, and associated inexperience of the pair of wrens. Interestingly, the following year the male wren (and two new mates) built well-concealed nests and raised three broods of wrens.

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